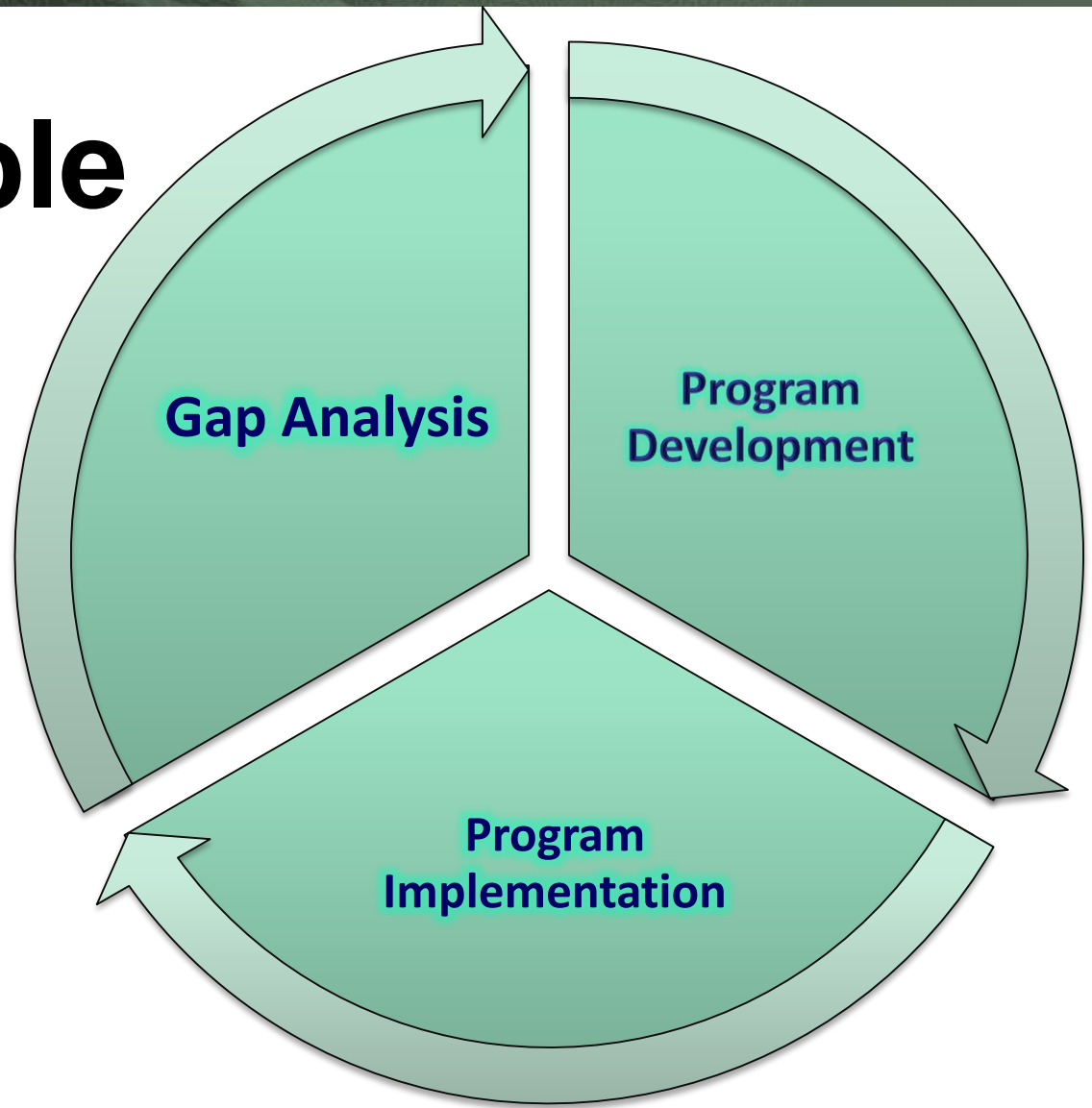
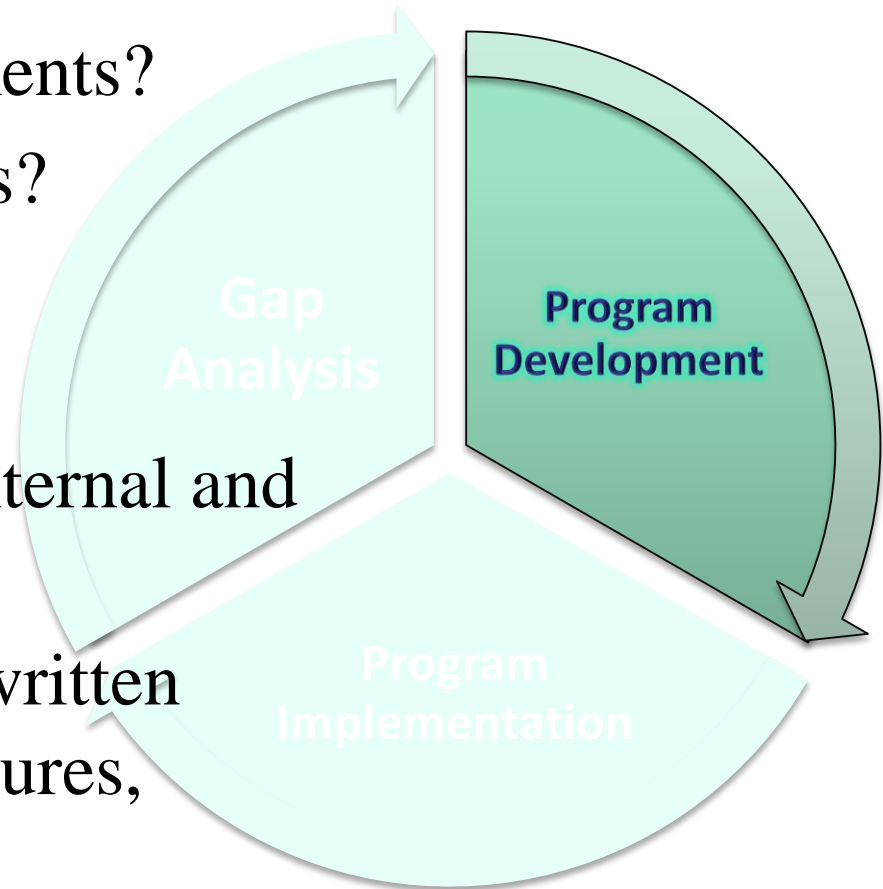


Sustainable MS4 Program



PROGRAM DEVELOPMENT

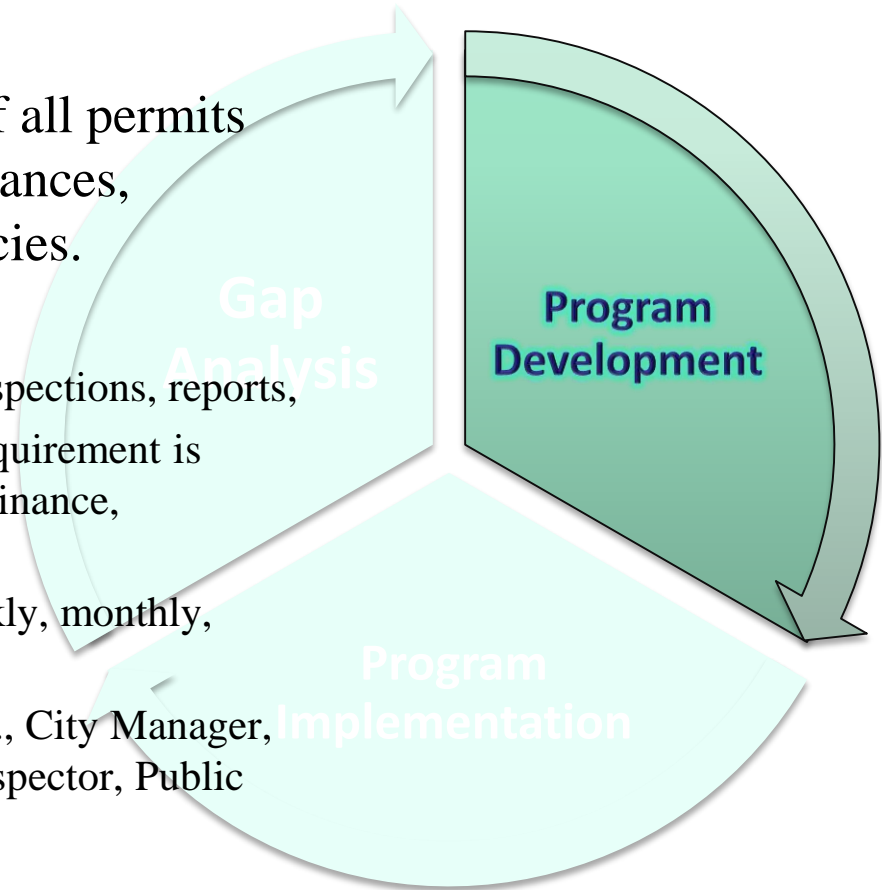
- What are the requirements?
- What are the resources?
- What are the local government's assets?
- Identify and engage internal and external partnerships
- Identify and develop written plans, policies, procedures, practices, etc.



PROGRAM DEVELOPMENT

Requirements

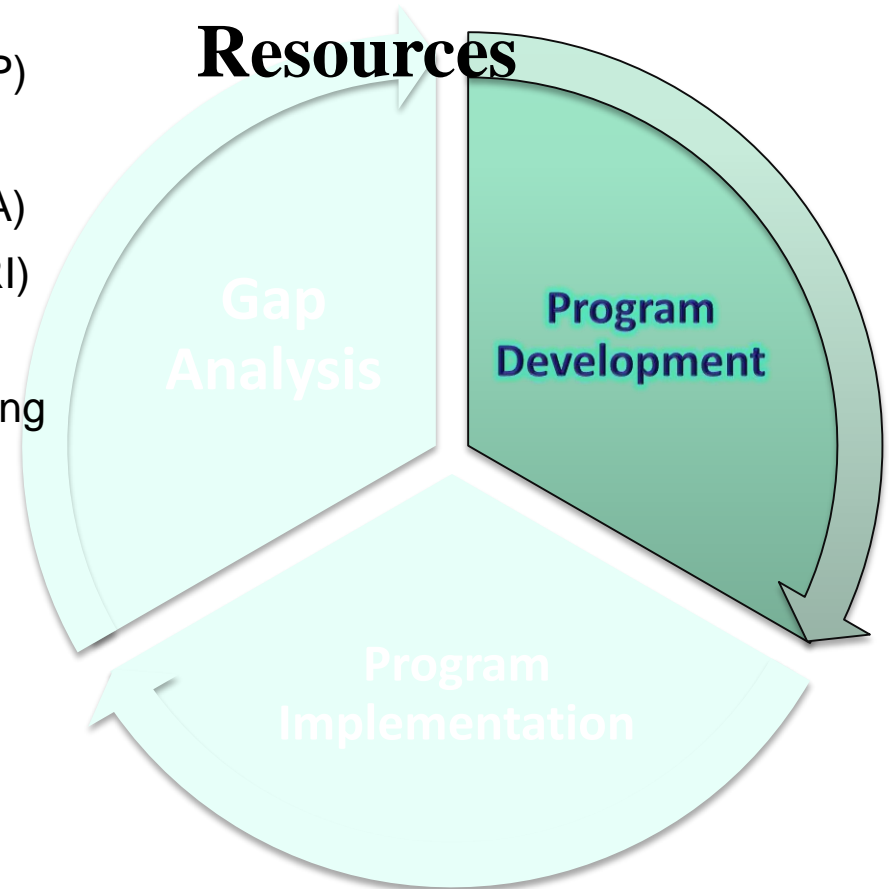
- Make a list and/or have copies of all permits and applicable regulations, ordinances, management mandates, and policies.
- Develop a matrix identifying:
 - What is required, i.e., plan, map, inspections, reports,
 - Why is it required and where the requirement is found, i.e., permits, regulations, ordinance, management mandate, policies
 - When it is required, i.e., daily, weekly, monthly, quarterly, annually
 - Who is going to make it happen, i.e., City Manager, Stormwater Administrator, Field Inspector, Public Works



- Federal and State Agencies and other Local Governments
- League on Municipalities
- Council of Government (COG)
- Clean Water Education Partnership (CWEP)
- Stormwater Association of NC (SWANC)
- American Public Works Association (APWA)
- Water Resources Research Institute (WRRI)
- NC Cooperative Extension
- NC State Biological, Agricultural, Engineering Stormwater Engineering Group
- UNC School of Government
- Environmental Groups
- Engineering Firms and Consultants
- Realtors, Home Builders Association, Developers
- Trade Associations
- Web sites, newsletters, and other publications

PROGRAM DEVELOPMENT

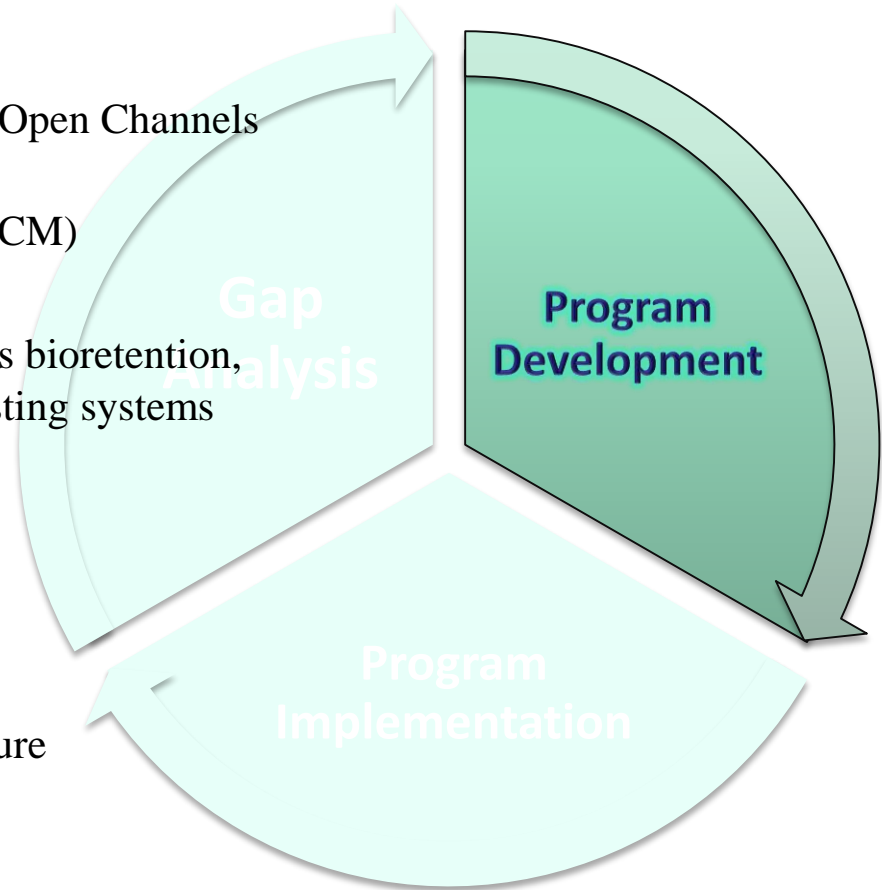
Resources



PROGRAM DEVELOPMENT

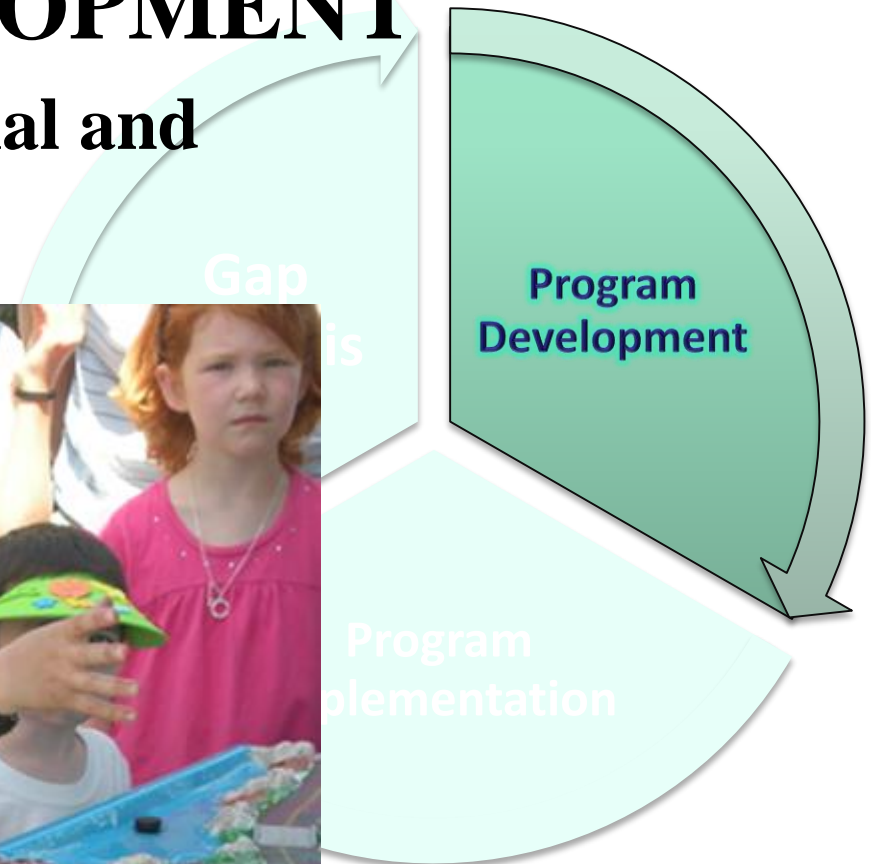
Identify Assets

- What are the assets?
 - Pipes, Structures, Culverts, Bridges, Open Channels and Roadside Ditches
 - Stormwater Amenities (BMPS and SCM)
 - Pump stations
 - Green Infrastructure practices such as bioretention, pervious pavement, and water harvesting systems
- What are the assets worth?
- Where are the assets located?
- How is the system operated?
- What is the condition?
 - Probability and Consequence of Failure
- What needs to happen?
 - Construct, Maintain or Replace
- How much will it cost to construct, maintain, or replace the asset?



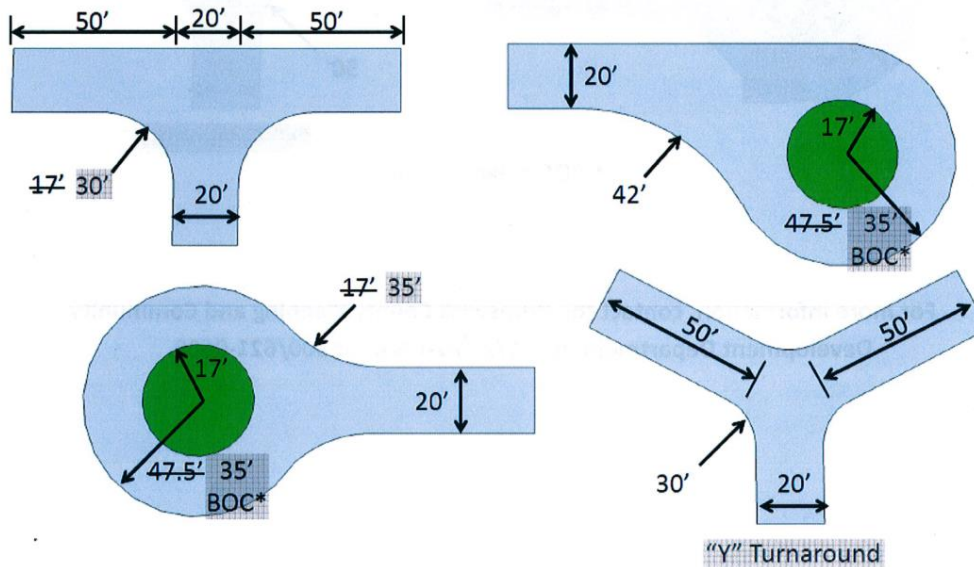
PROGRAM DEVELOPMENT

Identify and Engage Internal and External Partnerships



- Amend Section 8.9.4.F.2. Multiple Types of Terminal Access Streets, to consider options for reducing the cul-de-sac radius requirements, adjusting the cul-de-sac throat dimensions, and provide an additional option for a Terminal Access Street ("Y" Turnaround).

Option 1



* BOC = Back of Curb

- Local Government ordinances and policies can impede LID or facilitate LID
- Include:
 - local buffers,
 - dedicated open space
 - preserving and protecting trees
 - allowing shared driveways
 - reduced parking and cul-de-sac requirements

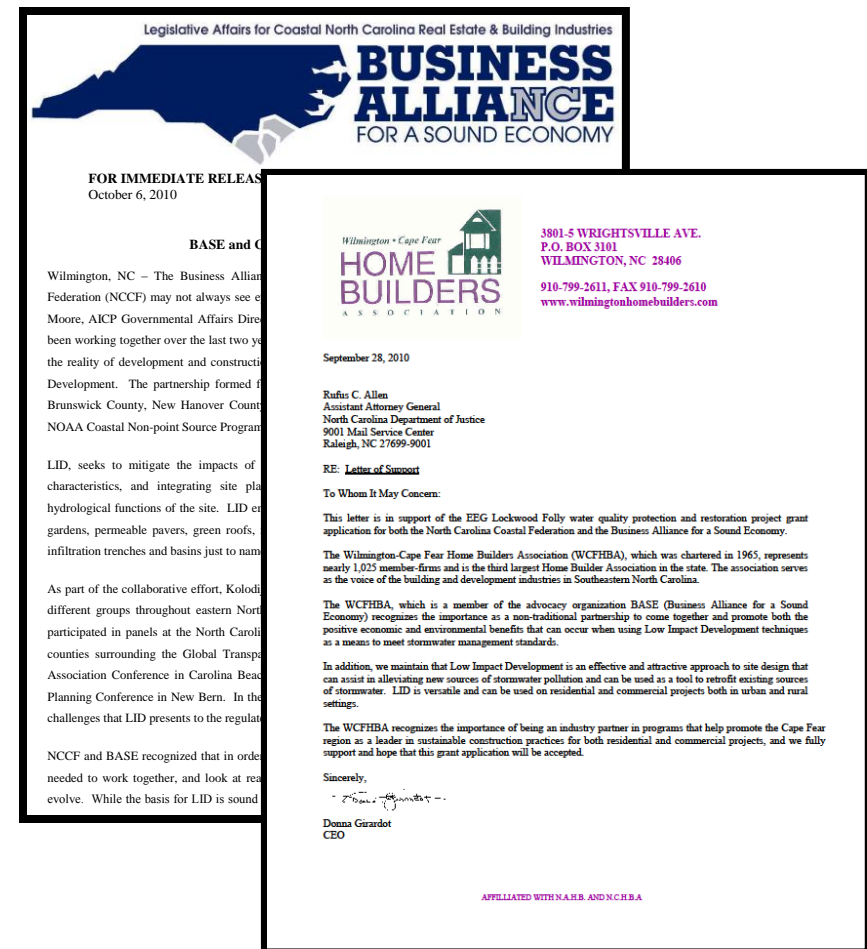
Identify and Foster Partnerships

Identify and Foster Partnerships

- **Business Alliance for Sound Economy (BASE)**
- **Wilmington-Cape Fear Homebuilders Association**

“...we maintain that Low Impact Development is an effective and attractive approach to site design that can assist in alleviating new sources of stormwater pollution and can be used as a tool to retrofit existing sources of stormwater. LID is versatile and can be used on residential and commercial projects both in urban and rural settings.”


– Wilmington-Cape Fear
Homebuilders Association



Joint Statement of Support

“Since 2007, the Business Alliance for a Sound Economy, Wilmington-Cape Fear Homebuilders Association, N.C. Coastal Federation, development professionals, academia and local and state government agencies have collaborated to promote the **voluntary** use of LID.... This successful **collaboration** and resulting design and permitting tools have generated **widespread interest** in advancing the use of LID. LID yields **positive economic and environmental benefits**. ...By incorporating LID stormwater management techniques early into the design and construction phase of projects, LID can make efficient use of the surrounding landscape. When designed appropriately and maintained it has been shown that LID can **reduce “hard” infrastructure costs, increase lot yields and enhance water quality protection.**”

State Technical Review & Minimum Design Criteria Teams




Stormwater Management

Step 1: Application Form

Project Name



Designer Name & Firm



NCDENR

Project Information

<p>Project Name: <input style="width: 90%;" type="text"/></p> <p>Project address: <input style="width: 90%;" type="text"/></p> <p>City, ZIP: <input style="width: 90%;" type="text"/></p> <p>Direction to project: <input style="width: 90%;" type="text"/></p> <p>River basin: <input style="width: 30%;" type="text"/></p> <p>Receiving water body: <input style="width: 90%;" type="text"/></p> <p>Stream class (a): <input style="width: 20%;" type="text"/></p> <p>Surface water area (a): <input style="width: 20%;" type="text"/></p> <p>Total property area (a): <input style="width: 20%;" type="text"/></p> <p>Project characteristics: (check all that apply)</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <p>Briefly summarize how the stormwater management practices will be implemented:</p> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>	<p>Date: <input style="width: 100%;" type="text"/></p> <p>Lot: <input style="width: 100%;" type="text"/></p> <p>Length: <input style="width: 100%;" type="text"/></p> <p>County: <input style="width: 100%;" type="text"/></p> <p style="text-align: center; color: #0070c0; font-weight: bold;">Coastal/Hatteras</p>
---	---

North Carolina Division of Water

Stormwater Best Management Practices Manual

July 2007*

Status of application:

Other permits needed:
(check all that apply)

☐
☐
☐

If an application for this project is:

Provide the permit type, number:

If claiming water rights, then indicate:

☐ Approval of water right
 ☐ Valid building permit
 ☐ Other

Local jurisdiction for building approval:

Point of contact:

Applicant and Title:



**North Carolina
Division of Water Quality**

Stormwater Best Management Practices Manual

July 2007*



*Individual chapters of the BMP Manual will be updated periodically. Individual chapters may be more recent than July 2007.

- Develop Practices, Tools, & Training to Facilitate LID
- Minimum Design Criteria
 - Overland Flow
 - Disconnected BUA
 - Soil Amendments
 - Rainwater Harvesting
 - Blue and Green Roofs
 - Bioretention
 - Infiltration Swales

StormEZ **Step 1: Application Form** **Project Name**
Designer Name & Firm

Project Information

Project Name: _____ Date: _____
 Project address: _____ Lot: _____
 City, ZIP: _____ Level: _____
 Direction to project: _____ County: _____ Coastal/Non-coastal

River to join: _____
 Receiving stream(s): _____
 Stream class(es): _____
 Surface water area (ac): _____ Coastal wetland area (ac): _____
 Total property area (ac): _____ Total project area (ac): _____

Project characteristics:
☐ LID ☐ Low density ☐ Drain to an off-site stormwater system
☐ High density ☐ Within 575' of Saltwater ORW ☐ Within 5 miles of a public airport

Briefly summarize how the stormwater runoff will be treated:

Permit Information

Status of application: _____ Status of construction: _____
 Other permits needed:
☐ Sedimentation & erosion control ☐ 404 permit / 401 certification
☐ CMAA major permit ☐ Related wetlands permit
☐ Threatened & endangered species ☐ NPDES Industrial stormwater permit

If an application for this project has been previously returned, provide the original project number and previous name of the project:

Provide the permit type, number and issue date for any permits that have already been obtained for this project:

If claiming water rights, then identify (and attach) the supporting documents and approval dates:
☐ Approval of a site-specific development plan or PUD → Approval date: _____
☐ Valid building permit → Issue date: _____
☐ Other → Date: _____

Local jurisdiction for building permit:
 Point of contact: _____ Phone number: _____

Contact Information

Applicant and Title: _____ Status: _____

OR

StormEZ **Step 2: Application Form** **Project Name**
Designer Name & Firm

Project Information

Project Name: _____ Date: _____
 Project address: _____ Lot: _____
 City, ZIP: _____ Level: _____
 Direction to project: _____ County: _____ Coastal/Non-coastal

River to join: _____
 Receiving stream(s): _____
 Stream class(es): _____
 Surface water area (ac): _____ Coastal wetland area (ac): _____
 Total property area (ac): _____ Total project area (ac): _____

Project characteristics:
☐ LID ☐ Low density ☐ Drain to an off-site stormwater system
☐ High density ☐ Within 575' of Saltwater ORW ☐ Within 5 miles of a public airport

Briefly summarize how the stormwater runoff will be treated:

Permit Information

Status of application: _____ Status of construction: _____
 Other permits needed:
☐ Sedimentation & erosion control ☐ 404 permit / 401 certification
☐ CMAA major permit ☐ Related wetlands permit
☐ Threatened & endangered species ☐ NPDES Industrial stormwater permit

If an application for this project has been previously returned, provide the original project number and previous name of the project:

Provide the permit type, number and issue date for any permits that have already been obtained for this project:

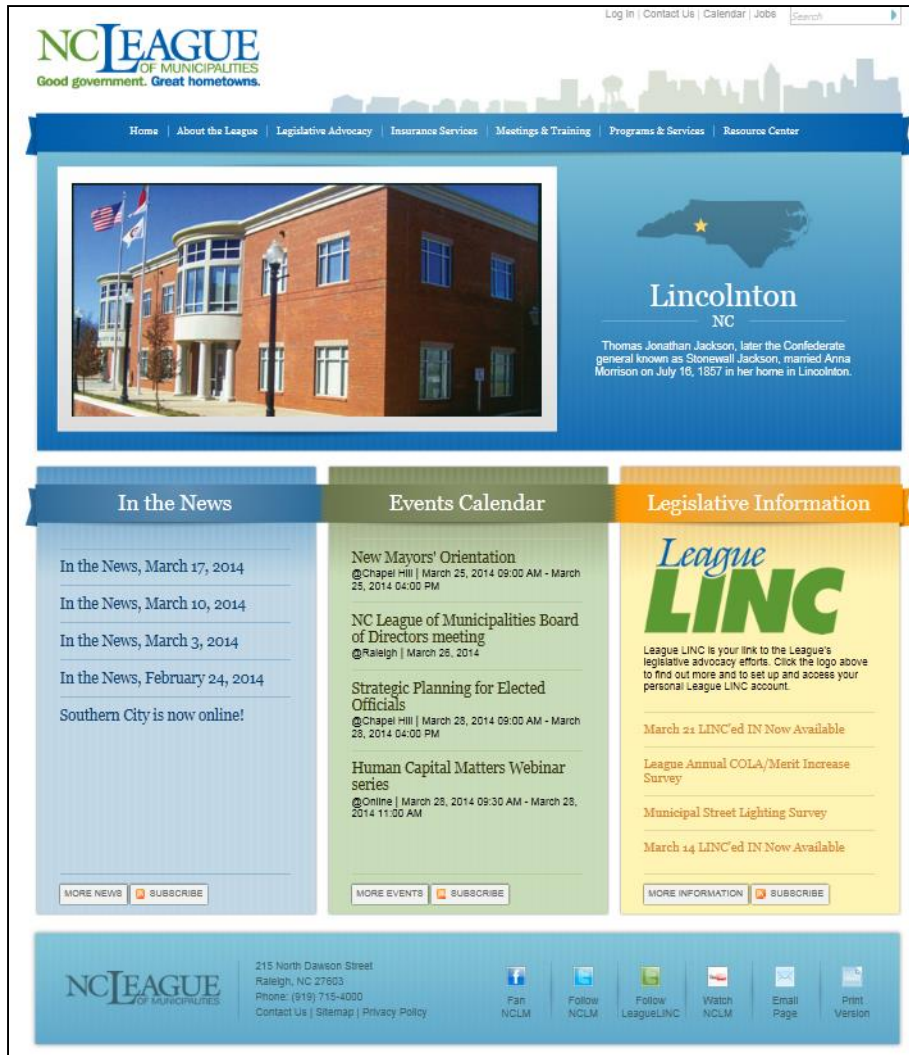
If claiming water rights, then identify (and attach) the supporting documents and approval dates:
☐ Approval of a site-specific development plan or PUD → Approval date: _____
☐ Valid building permit → Issue date: _____
☐ Other → Date: _____

Local jurisdiction for building permit:
 Point of contact: _____ Phone number: _____

Contact Information

Applicant and Title: _____ Status: _____

Stormwater Association of North Carolina (SWANC)



- Members
 - Local Governments
 - Engineering Firms
 - Consultants
 - NC League of Municipalities
- Work with General Assembly and State Agencies
- Building Sustainable Programs



- Annual Conference
- Ongoing Workshops
 - Pollution Prevention and Good Housekeeping
 - Illicit Discharge Detection and Elimination
 - Post Construction
 - EPA and State Audit Protocols
 - LID/GI
- Building Sustainable Programs



Photo courtesy Coastal Training Program

Low Impact Development & Storm-EZ Workshops

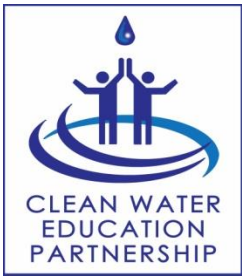
BMP Inspection and Maintenance Certification Course

LID Certification Course

BMP Design Certification Course



http://www.bae.ncsu.edu/stormwater/training/storm_ez.html



Triangle J Council of Governments Clean Water Education Partnership (CWEP)



Piedmont Triad Regional Council SMART (Stormwater Management and Recovery of the Triad)



Western Piedmont Council of Governments

Illicit Discharge Detection and Elimination & Pollution Prevention & Good Housekeeping Class



WNC Stormwater Partnership Pollution Prevention / *Good Housekeeping*

For questions, please contact

annie@landofsky.org

or

erica@landofsky.org

WNC Stormwater Management Training
and Good Housekeeping Presentations from the February
meeting are available here:

<ftp://landofskygis.org/Stormwater/Presentations/>

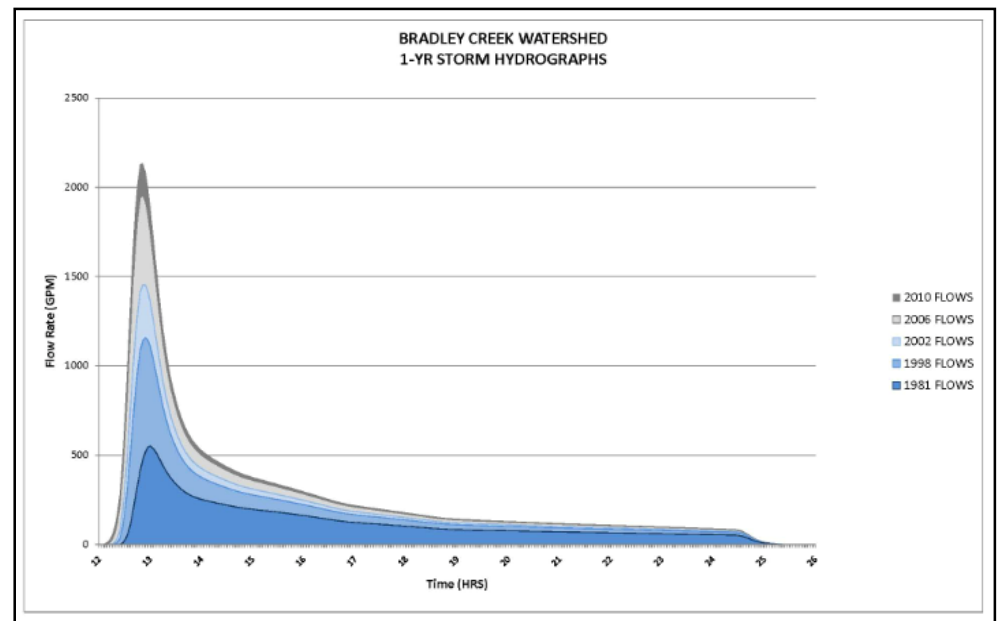
Thank you for attending!



SPEAKERS:

Mitch Woodward, Area Specialized Agent, Watersheds and
Water Quality, North Carolina Cooperative Extension, North
Carolina State University

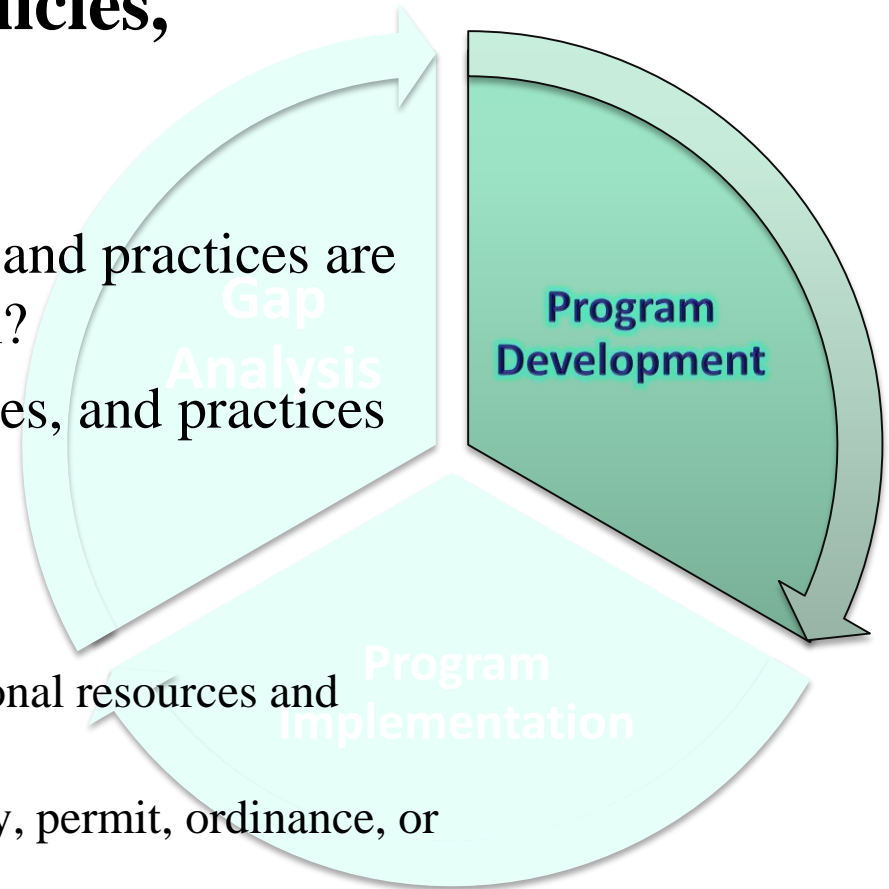
Mike Randall, Stormwater Staff Engineer
MS4 Permit Program for Phase I and II and Technical Support
for Stormwater Programs, Division of Energy, Mineral and
Land Resources, NCDENR



PROGRAM DEVELOPMENT

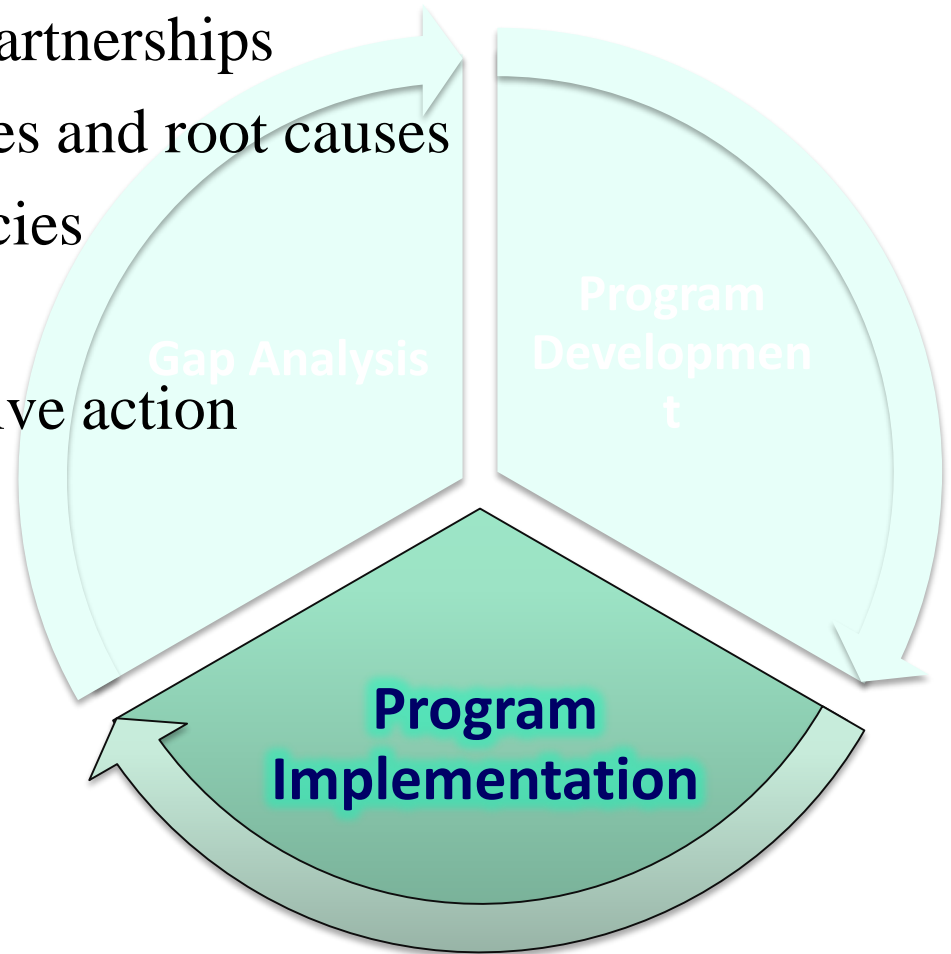
Develop Written Plans, Policies, Procedures, and Practices

- What plans procedures, policies, and practices are needed for a sustainable program?
- For each plans procedures, policies, and practices
 - Who is going to make it happen?
 - What they're going to do?
 - When are they going to do it?
 - Where are they going to find additional resources and information?
 - Why are they doing it, i.e., by policy, permit, ordinance, or regulation?



PROGRAM IMPLEMENTATION

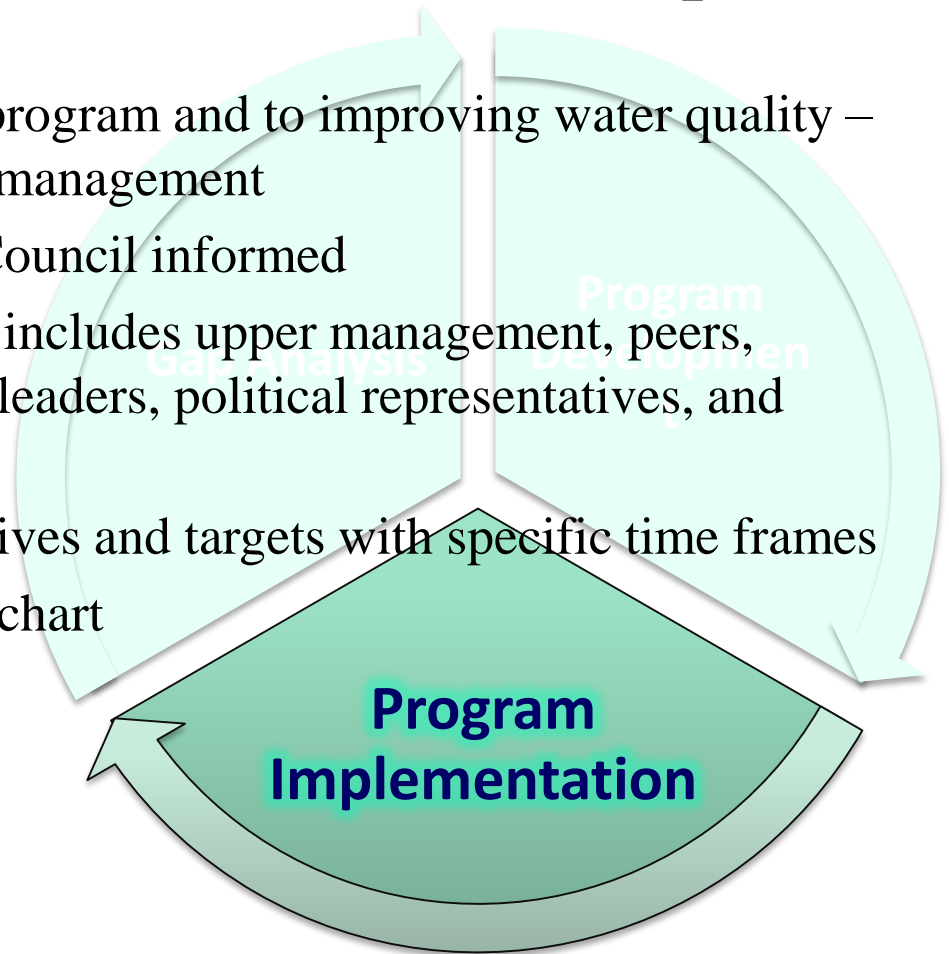
- Foster internal and external partnerships
- Process to identify deficiencies and root causes
- Document and track deficiencies
- Process to report deficiencies
- Process to implement corrective action



PROGRAM IMPLEMENTATION

Foster Internal and External Partnerships

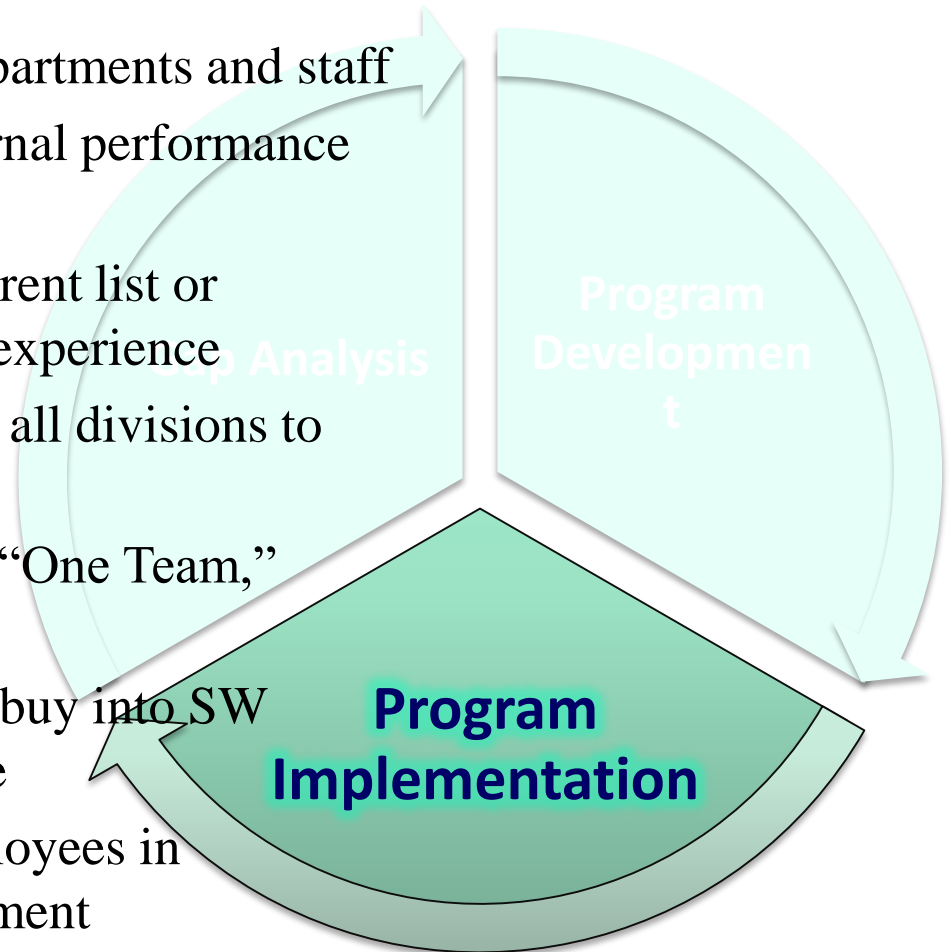
- Written commitment to the MS4 program and to improving water quality – prepared for and signed by upper management
- Keep partners, citizens and City Council informed
- Establish a Stormwater Team that includes upper management, peers, subordinates, regulators, industry leaders, political representatives, and neighborhood support
- Identify clear water quality objectives and targets with specific time frames
- Maintain a current organizational chart



PROGRAM IMPLEMENTATION

Foster Internal and External Partnerships

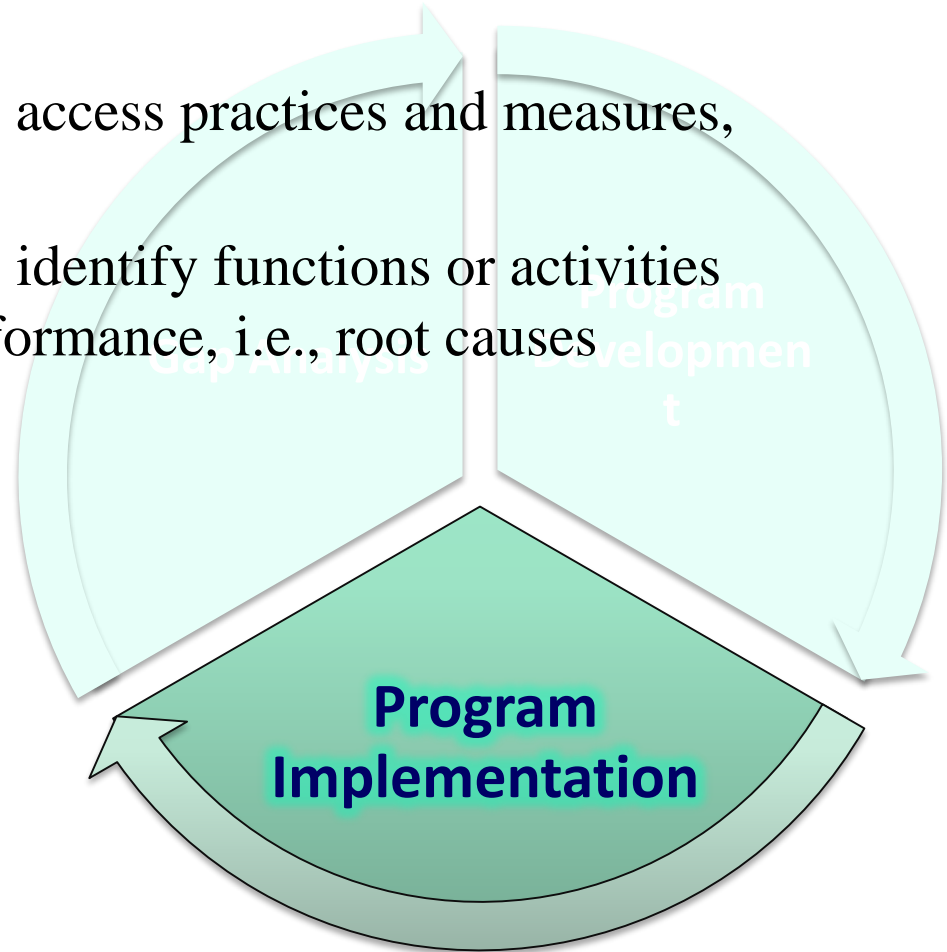
- Provide cross training to other departments and staff
- Maintain a list/description of internal performance criteria
- For each employee maintain a current list or description of required skills and experience
- Coordination between and among all divisions to breaking down barriers
- Organizational culture - based on “One Team,” where everyone takes ownership
- Department goal – have city staff buy into SW mission statement and compliance
- Develop a process to engage employees in compliance and program management



PROGRAM IMPLEMENTATION

Process to Identify Deficiencies and Root Causes

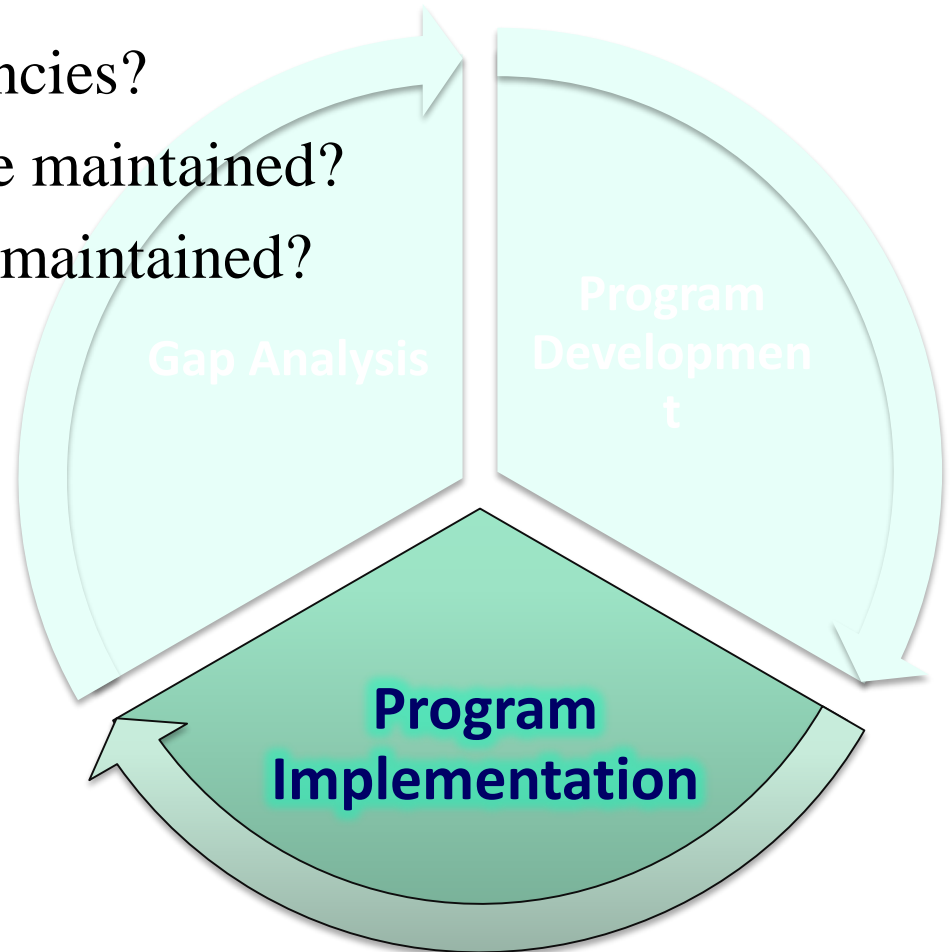
- Regular meetings with staff to assess practices and measures, identify deficiencies
- Establish a written program to identify functions or activities that can enable or impede performance, i.e., root causes



PROGRAM IMPLEMENTATION

Document and Track Deficiencies

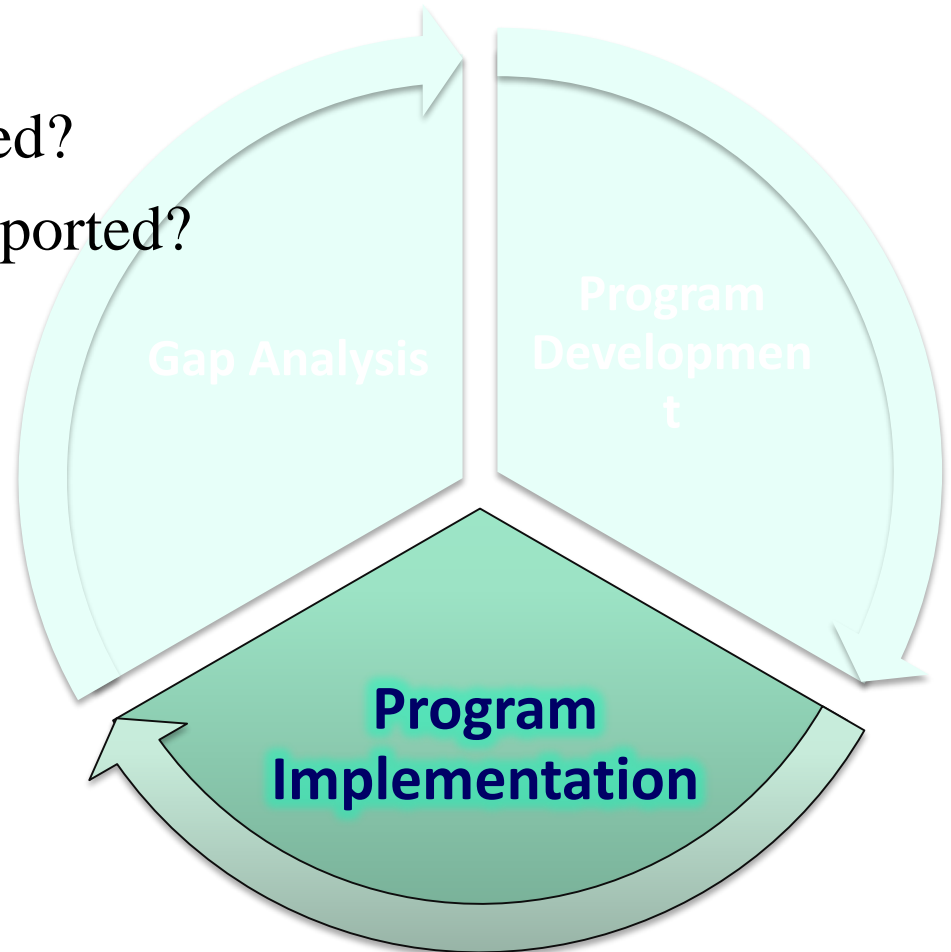
- Who is going to track deficiencies?
- Where records are going to be maintained?
- What records are going to be maintained?



PROGRAM IMPLEMENTATION

Process to Report Deficiencies

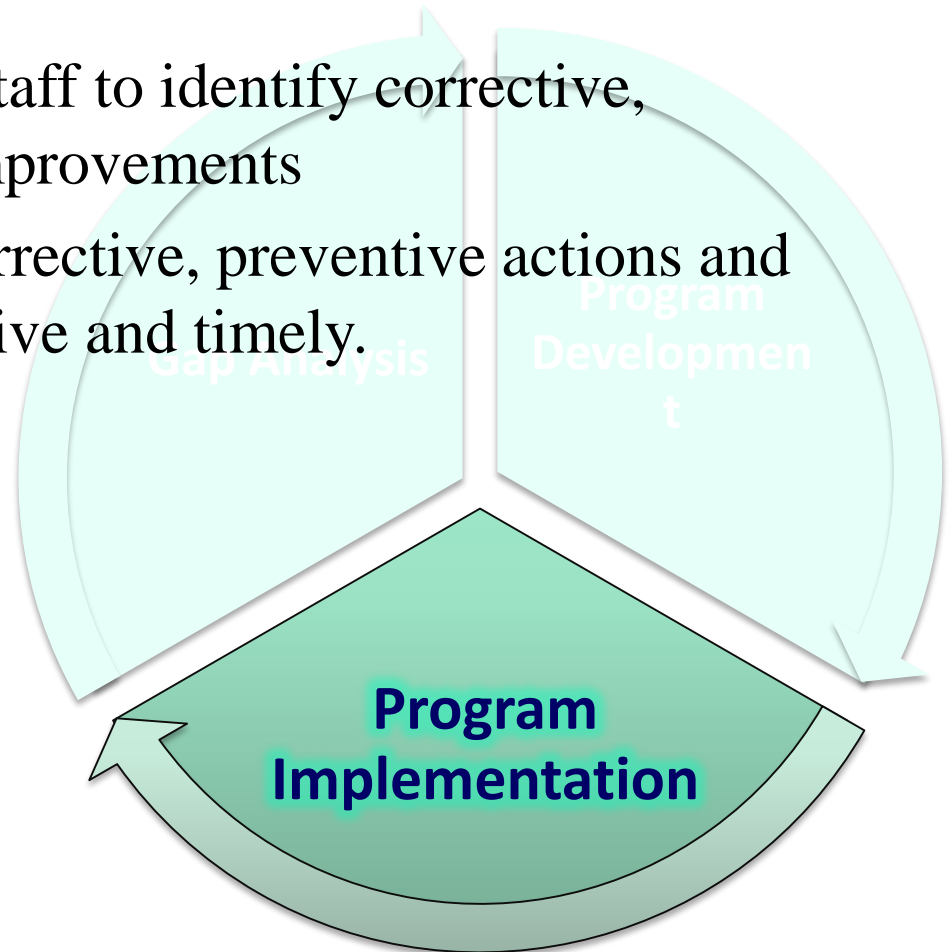
- How are deficiencies reported?
- To whom are deficiencies reported?



PROGRAM IMPLEMENTATION

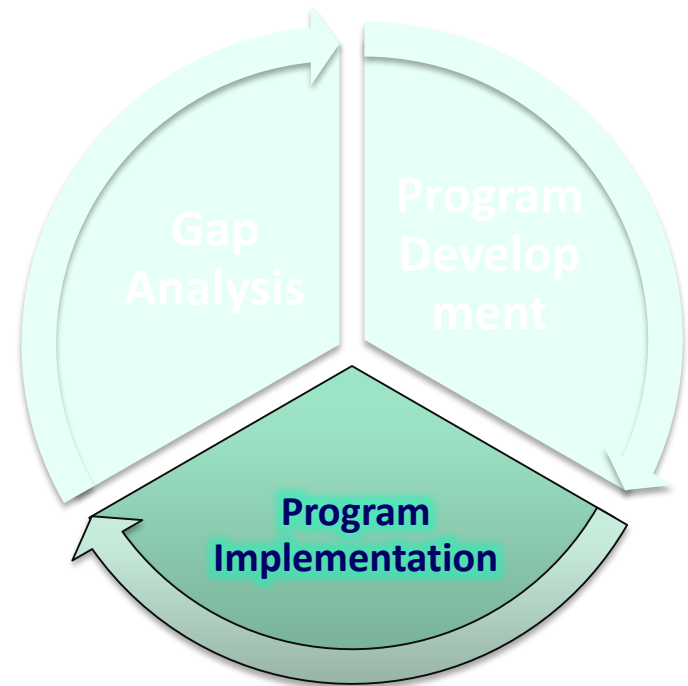
Process to Implement Corrective Action

- Regular meetings with staff to identify corrective, preventive action and improvements
- Process to verify that corrective, preventive actions and improvements are effective and timely.

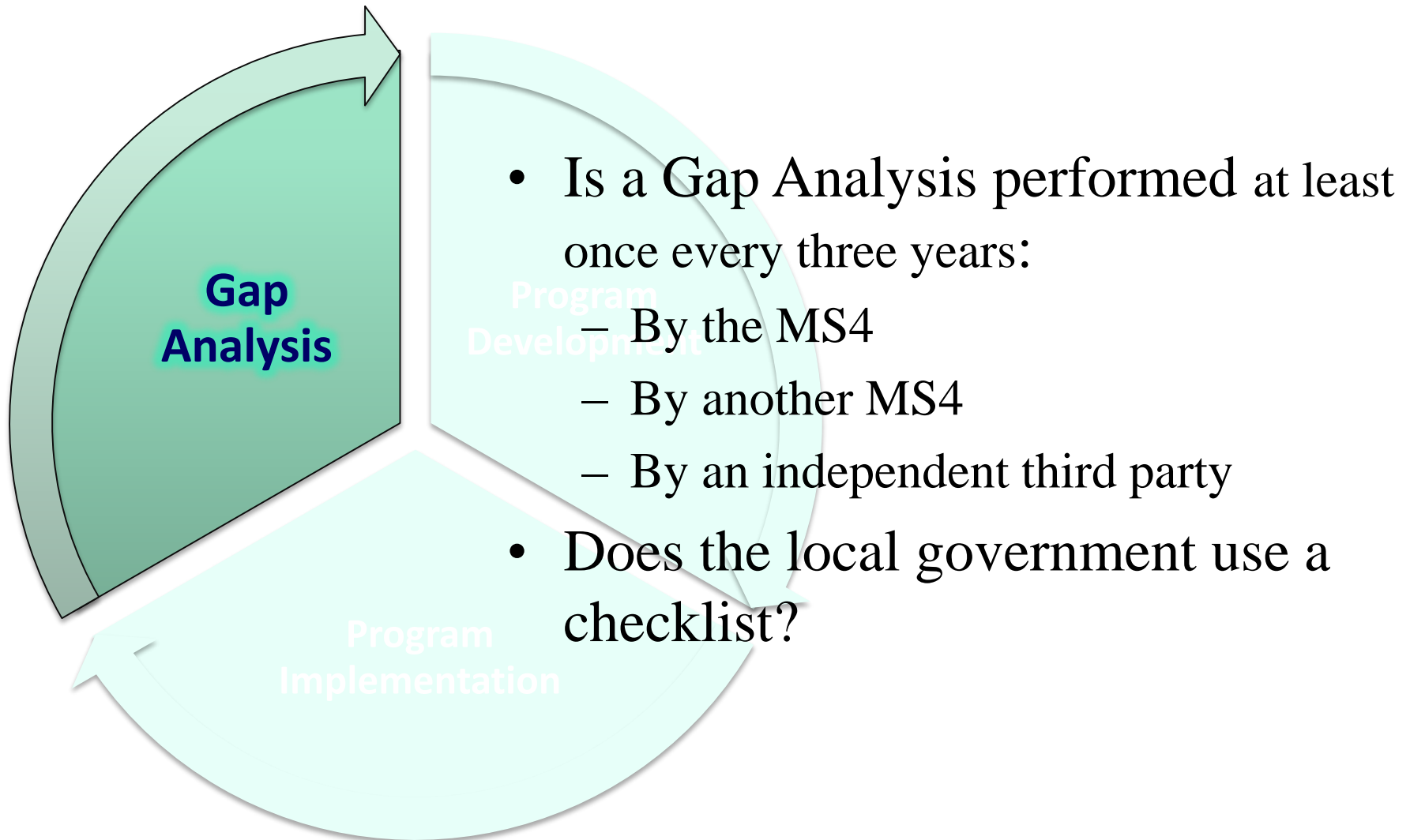


Process to Implement Corrective Action

- Does the process identify who will develop a Corrective Action Plan?
- Does the Corrective Action Plan identify:
 - The deficiency?
 - The root cause?
 - Specific measures to be implemented?
 - Who needs to be trained and what training they need?
- Has the Corrective Action mitigated the deficiency?



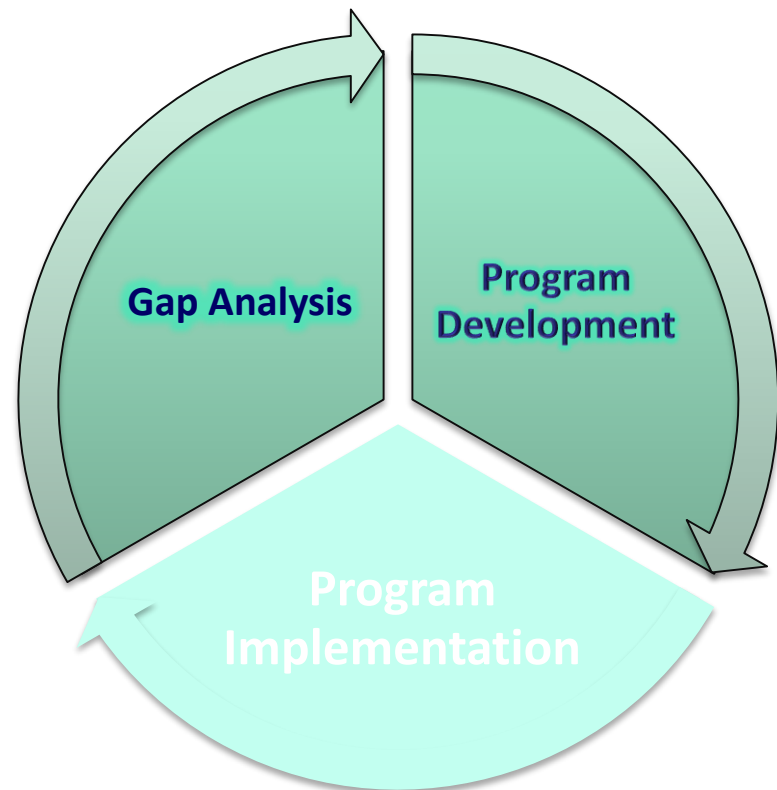
GAP ANALYSIS



GAP ANALYSIS

Program Development

- Has the MS4 identified all applicable requirements?
- Has the MS4 identified the resources?
- Has the MS4 developed an Asset Management and Capital Improvement Plan
- Has the MS4 identified and engaged internal and external partners?
- Has the MS4 identified and developed written plans, policies, procedures, practices, etc.?



GAP ANALYSIS

Program Implementation

- Has the MS4 fostered internal and external partnerships?
- Has the MS4 developed a process to identify, document, track, and report deficiencies
- Has the MS4 identified root causes?
- Has the MS4 developed a process to implement corrective action?

